THE EFFECTS OF SEWAGE ON ALPINE STREAMS IN KOSCIUSKO NATIONAL PARK, NSW

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Abstract. The impact of resort developments in three alpine streams of Kosciusko National Park was examined by the State Pollution Control Commission of NSW over 1981 and 1982. Physico-chemical measurements such as nutrient concentrations, stream flow and temperature were correlated with measures of periphyton growth using artificial substrates and the Thomas (1978) method for estimation of in-stream biomass.

Stream flow was the major physical parameter controlling in-stream periphyton growth, far outweighing seasonal temperature variations. Nutrients emanating from resort developments were also a major influence on biomass and taxa. Natural accumulations occurred upstream of resort developments under low flow conditions and were associated with taxa typical of clean water conditions. The relationships between periphyton biomass and nutrient loads could be quantified.

Introduction

The Kosciusko National Park, in the south-eastern region of New South Wales, is the largest national park in the State (690000 ha) and encompasses the major alpine region of Australia (Figure 1). The Park's wide variety of natural features attract over 2 million visitors a year (National Parks and Wildlife Service, 1982), and there is significant pressure for further development. Around 60% of tourists visit in the 3-4 month snow sports season and 40% through the rest of the year, with emphasis on the school holidays (Department of Environment and Planning, 1983).

Five major resort complexes, with day- and overnight visitor facilities, have been developed to cater for recreational skiing within the Park: These are located at Thredbo Village, Smiggin Holes, Perisher Valley, Guthega and Charlottes Pass (Figure 1). Streams in the Park receive treated effluent from the resorts, and other discharges associated with urban development. They have other important functions, including provision of habitats for indigenous aquatic flora and fauna, provision of recreational facilities and supply of potable water for Park users.

Objectives

This study was conducted by the New South Wales State Pollution Control Commission in 1981-82 to determine the impact of resort development on alpine streams, in particular whether their use to dilute, transport and assimilate secondary-treated sewage effluents is detrimental to the other uses of these waters. The objective of this paper was to demonstrate the impact of nutrients emanating...
from village development and wastewater on the aquatic flora of three alpine streams.

The study of the Thredbo River followed one season after that of Cullen (1983). The study of Pipers and Spencers Creeks is the first investigation of the impact of development on the smaller streams which flow through alpine wetland and upland heath vegetation.

**Study Area**

The eutrophication impact of three resort areas, detailed in Table I, was studied in the three alpine streams (Figure 1) which receive effluent.

Wherever possible, the study streams were sampled upstream and immediately downstream of village development areas, downstream of the discharge point for sewage treatment works, and at a suitable recovery site further downstream. Sites (Figure 1) were selected for uniformity for comparison purposes, proximity, ease of access and absence of other known catchment disturbances such as land clearing and road building, and some of their physical features are summarised in Table II.